

Application Serial No: 09/876,372  
In reply to Office Action of 19 Jun 2003

Attorney Docket No. 80002

REMARKS / ARGUMENTS

Claims 9-14 are currently pending in the application. Claims 1-8 have been withdrawn from consideration. Claims 9-14 stand rejected. Claims 9, and 11-13 are amended. Claim 10 is canceled without prejudice.

The Examiner required restriction to one of the following inventions under 35 U.S.C. § 121:

- I. Claims 1-8 drawn to a process of making an object, classified in class 264, subclass 401; and
- II. Claims 9-14 drawn to an apparatus for making an object, classified in class 425, subclass 174.2.

The Examiner coorectly noted that Applicant provisionally elected the invention of Group II, claims 9-14, with traverse on 3 June 2003.

The Examiner rejected claims 9-14 under 35 U.S.C. § 103(a) as being unpatentable over Jacobs et al. (Reference B: United States Patent No. 5,688,464) in view of Ueno et al. (Reference F: United States Patent No. 6,003,832) and Bishop et al. (Reference C: United States Patent No. 5,840,241).

These rejections and objections are respectfully traversed in view of these amendments and remarks.

Jacobs et al appear to teach methods and apparatus for providing a vibrational enhancement to the recoating process in stereolithography are disclosed. The formation of a thin layer

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of building material over a previous layer of structure of a partially completed three-dimensional object, in preparation for formation of an additional layer of structure, is enhanced by the use of vibrational energy imparted to the building medium. In a first preferred apparatus, vibration is induced into the surface of the material by a plurality of vibrating needles that penetrate below the working surface to a sufficient depth to ensure adequate coupling but not deep enough to come into contact with the surface of the partially completed part. In a second preferred apparatus, vibration is coupled directly to the object support. The vibrational energy is then transmitted through the part to the surface of the building material. In a first preferred method the partially completed object is overcoated with material and vibration is used to reduce the coating thickness. In a second preferred method, the partially completed object is under-coated with material and vibration is used to increase the coating thickness.

Ueno et al. appear to teach a mold having a cavity for shaping a three-dimensional object, which comprises a photocured resin of a photocurable resin composition comprising (A) a liquid photocurable resin, and (B) at least one reinforcing agent selected from the group consisting of inorganic solid particles having an average particle diameter of 3 to 70 $\mu$ m. and a whisker having an average diameter of 0.3 to 1.0 $\mu$ m., a length

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of 10 to 70 $\mu$ m. and an aspect ratio of 10 to 100 and optionally, in which the inner surface of the cavity is covered by a solid film having a thickness of 5 to 1000 $\mu$ m.

Bishop et al. appear to teach that standing planar compression waves are used to control the spacing and alignment of previously randomly distributed and randomly oriented loose fibrous elements in a fluid medium. Standing planar compression waves are established within the medium by a magnetostrictive or piezoelectric transducer. The fibrous elements gravitate to the nodes of the standing waves and align themselves parallel to the vibrating surface of the transducer. The composite material may be solidified by cooling (or other process), which freezes the fibrous elements in an aligned array, thereby effecting the directional dependency of various structural properties of the composite material (including compression strength, tensile strength, and modulus of elasticity).

Applicants respectfully elect to pursue prosecution of claims 9-14 while retaining the right to file a divisional application on withdrawn claims 1-8.

Claim 13 has been amended to correct a typographical error.

In view of the Examiner's rejection of claims 9-11 and 14, Applicants have amended claim 9 to specify that the at least two acoustic transducers are at least two transducer arrays having transducer elements. The amendend claim futher incorporates the

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acoustic controller element of claim 10 therein. The acoustic controller element has been modified to emphasize that it must be capable of beamforming transducer elements in the transducer arrays. These amendments are supported in the specification at page 14, lines 20-25.

Applicants respectfully suggest that the device taught by Bishop et al. is incapable of beamforming because multiple transducer elements are required for beamforming and Bishop et al. only teach two transducer elements. Furthermore, Bishop et al. do not disclose beamforming or indicate that computer 24 has the capability of beamforming. Applicants respectfully request reconsideration and allowance of claim 9. Claims 11 and 14 should be allowable by dependency.

Applicants have amended claim 12 to place it in independent form incorporating all of the limitations of parent claim 9 and intervening claims 10 and 11. Applicants respectfully suggest that neither Jacobs et al., Ueno et al nor Bishop et al. teach coordination between the object controller and the acoustic controller for coordinating the acoustic field with the portion of the fluid medium being subjected to the stimulation means. As taught by Applicants, at page 14, line 25 through page 15, line 6, this allows precise positioning of the solid reinforcing material within the fluid medium. This gives the advantage of having precise coordination and control of the reinforcing

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material to give an object having tailored properties. The prior art neither teaches these advantages nor renders them obvious. Applicants respectfully request reconsideration and allowance of claim 12 as amended. Applicants suggest that claim 13 should be allowable by dependency.

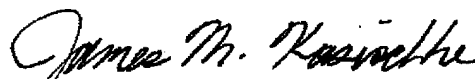
All of the remaining claims in the application, claims 9 and 11-14 are now believed to be in condition for allowance. Re-examination and favorable reconsideration in light of the above amendments and the following comments are respectfully requested.

The Examiner is invited to telephone the undersigned, Attorney for Applicants, at 401-832-4736 if, in the opinion of the Examiner, such a telephone call would serve to expedite the prosecution of the subject patent application.

Respectfully submitted,

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12 September 2003

By   
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